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ABSTRACT

The increasing use of upper-grade students as tutors for younger children has been viewed as a means of reducing the achievement gap that exists among culturally-disadvantaged children. However, research has indicated that the potential of such a tutorial arrangement is linked closely to the tutoring techniques used, and unless student tutors are trained in specific tutoring techniques that facilitate learning, they do not generally employ effective tutoring techniques. This study was designed to empirically identify procedures and techniques appropriate for training upper-grade elementary student tutors. The specific objectives of the study were: (1) the discovery of relevant tutoring techniques when upper-grade elementary students tutor first-grade children who are having difficulty with sentence equations; (2) the empirical validation of the specified tutoring techniques identified; (3) the development and validation of an instrument for assessing a tutor's mastery of the specified tutoring techniques; and (4) the specification and validation of tutor-training procedures. (Author/AG)

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EMPIRICAL VALIDATION

of

TUTOR-TRAINING PROCEDURES[1]

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SUMMARY

Purpose and Objectives

There is increasing use of upper-grade students as tutors for younger children. This trend has been viewed as a means of reducing the achievement gap that exists among culturally-disadvantaged children. However, research has indicated that the potential of such a tutorial arrangement is linked closely to the tutoring techniques used by the student tutors. Research has established that unless student tutors are trained to use specific tutoring techniques that facilitate learning, they do not generally use effective tutoring techniques. This study was designed to empirically identify training procedures and techniques appropriate for training upper-grade elementary student tutors.

The specific objectives of the study were: (1) the discovery of relevant tutoring techniques when upper-grade elementary students tutor first-grade children who are having difficulty with sentence equations; (2) the empirical validation of the specified tutoring techniques identified; (3) the development and validation of an instrument for assessing a tutor's mastery of the specified tutoring techniques; and (4) the specification and validation of tutor-training procedures.

Procedures

The study was carried out in four phases. I: Identification and validation of relevant tutoring techniques. II: Development of Tutor-Observation Scales. III: Empirical formulation of tutor-training procedures. IV: Validation of the training procedures.

A trial-and-revision strategy was used during the first three phases of the study. This involved the formulation of an idea, trying it out, and revising it on the basis of the trial. This strategy was employed until the stated objectives were reached.

The final phase consisted of using the training procedures identified in Phase III to train sixteen upper-grade elementary

students in the use of the specified tutoring techniques identified in Phase I, and then the Tutor-Observation Scales developed in Phase II were used to measure the effectiveness of the tutor-training procedures.

Results

The training procedures were very effective in training the student tutors to use the specified tutoring techniques. The student tutors' over-all mastery of the ten specified techniques was 89.6%.

I. STATEMENT OF PROBLEM AND OBJECTIVES

The high incidence of failure among disadvantaged students has been pointed out repeatedly (Hayes, 1964; Newton, 1962; Smith, 1965; Cloward, 1966). The rate of failure among children of disadvantaged backgrounds is indicated by the findings that at the third grade level about two-thirds of the children are one year behind in their achievement, and that this gap continues to increase to as much as five years at the high school level (Bloom, 1966). Research indicates that one key to preventing failure is adapting instruction to the learning needs of each child. Unfortunately, because of the size of the average class and the broad range of individual differences, teachers often find it impossible to adequately adapt instruction to the specific learning needs of each child.

Currently the most popular and, from most indications, promising solution to the achievement gap of disadvantaged children, is to provide the child with individual tutoring. The major problem with this approach has been providing those who do the tutoring adequate training. In the Los Angeles area efforts are being made to meet this problem. The Los Angeles City Schools employ a full-time specialist and five consultants to assist in the training and orientation of those who participate in various volunteer tutorial projects. Their services have also been utilized in the training of tutors who have participated in tutorial projects in the area sponsored by Economic and Youth Opportunities Agency of Greater Los Angeles.

Many of the colleges which have tutorial projects are also attempting to provide their tutors with more professional help and supervision. More and more materials are being developed to aid those who act as tutors.

The number of tutorial projects in the Los Angeles area is encouraging. Key personnel from the Urban Affairs Office in Los Angeles have noted that the nation as a whole is beginning to look at the various tutorial projects in the Los Angeles area. Most encouraging is the fact that many of the tutorial projects are designed to help disadvantaged children (e.g. One to One Summer Tutoring in Reading, Bethel Church Tutorial Project in Venice).

Even as extensive as the tutorial projects are in the Los Angeles area, they currently are not designed to get at the very root of the problem. In reviewing the existing tutorial projects in the area, it was discovered that there is virtually no tutorial assistance for disadvantaged children in the first grade; existing tutorial projects do not provide individual tutoring below the third grade. Consequently, children with disadvantaged backgrounds are not getting the individual help they often need at the most critical point in their entire school experience. Instead of taking preventive steps in the primary grades, the effort is almost solely that of remedying the achievement gap that has occurred during the primary grades.

Several of the elementary schools in the Los Angeles area are attempting to solve this problem on their own. It has been found that there is a definite trend to have upper elementary grade students tutor children in the primary grades. Currently, however, there is no provision for training or orienting the children who are being used as tutors.

Some recent innovations in the concept of individualized tutoring give every indication that there is unlimited potential in the trend to use upper grade elementary children to tutor children in the primary grades. An entirely new concept in tutoring has been introduced, referred to as programmed tutoring (Ellson, 1966). This technique utilizes principles of learning which have been identified primarily with programmed instruction in which the tutorial procedures are carefully prescribed, and conform to the basic tenets of programmed instruction, but allows for maximal sensitivity to the individual learning characteristics of the children being taught. Programmed tutoring is a teaching technique rather than a set of materials so that the subject matter taught can be determined entirely by the curricular requirements of the school system in which it is used.

From its earliest formulation, programmed instruction has been described as an instructional technique capable of taking into account individuality in the learning process. The very fact, however, that programmed instruction is almost solely dependent on reading ability has made it extremely difficult to take advantage of the possible individualization with children in the primary grades. By means of the programmed

tutoring technique that has been introduced by Ellson, it seems highly probable that the potential of programmed instruction can be conveyed to children with disadvantaged backgrounds in the primary grades. There are also advantages realized as a result of the individual attention provided by tutoring. Most significant, however, is that this form of tutoring has proven to be far superior to traditional forms of tutoring based on current teaching philosophy and practice. The findings suggest that the effectiveness of tutoring at this grade level is primarily dependent on whether or not the tutor follows the established theories of learning on which programmed instruction is based (Ellson, 1966).

In reviewing Ellson's work, several points are relevant to this study: (1) the data indicates that the benefits of programmed tutoring are noticeably greater for those children who have the most difficulty; (2) there is rather extensive evidence that children progress more rapidly in some academic areas when they receive this type of tutoring; (3) even though adults have primarily been used as tutors, Ellson makes the following statement: "It *is the investigator's impression that conscien*tious adults with more limited educational background--or even children--could be trained as tutors..." (Ellson, 1966); and (4) even though the materials used by Ellson are only in the area of reading, he is confident the technique could easily be adapted to other subject matter.

At the present time, the technique is only being considered in a very limited scope. The tutors are trained to work with specific materials that have been prepared especially for this technique. Yet there is every indication that this technique could be refined and prove effective in more general application. Ellson has noted the need for additional research in this area; "...although our tutoring procedures have demonstrated their effectiveness for this purpose, they are relatively new and we have much more to learn about the best way to use them," "...we have not carried out experimental evaluations of details of the procedures." (Ellson, 1966).

The following quote: "Tutoring programs are springing up across the country like jonquils...for some children the most effective teacher is another child" (U. S. Office of Education, 1967)

is typical of the positive response when programs are adopted where older children are used to tutor the younger children. (Cloward, 1966; McCracken, Leaf J.; Johnson, 1965; Cloward, 1966.)

As a result of the increasing trend in the Los Angeles area to use older elementary children as tutors, one of the more progressive superintendents was motivated to contact the Research and Development Center at UCLA and ask them to conduct a study that would look at some of the possible methods of training the children in their role as a tutor. This study did not result in specified tutor training procedures, but it did substantiate Ellson's feeling that older children can be trained to be tutors. The study demonstrated the ability of the children to apply basic learning theory (e.g. reward, etc.) (Frager, 1967). The research conducted by System Development Corporation also indicates that it is possible to train an elementary child to comply with some basic points of learning theory in the tutorial relationship.

This study was an extension of the research that has been cited, with particular emphasis on the validation of tutoring-training procedures. The specific objectives of the study were:

1. Identify and validate the relevant tutoring techniques in the tutorial relationship between upper-grade elementary children tutoring first-grade children.
2. Develop tutor-observation(s) capable of providing a measure of the degree of mastery of the specified tutoring techniques by the student tutors.
3. Specify the training procedures necessary to train student tutors in the use of the specified tutoring techniques.
4. Validate the training procedures.

II. DESCRIPTION OF ACTIVITIES

PHASE I - IDENTIFICATION OF SPECIFIED TUTORING TECHNIQUES

In an effort to identify appropriate objectives the researcher contacted the curriculum specialist in the school district[1] where the research was conducted. After considerable deliberation it was determined that one of the most basic problems of disadvantaged first-graders was in mathematics. The curriculum specialist indicated that disadvantaged first-graders consistently have a great deal of difficulty with sentence equations (e.g. $5 + \square = 7$). It was decided that the objectives would be in the area of sentence equations. The researcher was informed that the Greater Cleveland Mathematics Program was being used in the school district, so it was decided to investigate the feasibility of the tutors using these materials.

An evaluation-revision strategy was used to identify tutoring techniques relevant to the objectives and materials. Upper-grade elementary students were selected to tutor first-grade children. They were trained by the experimenter in various approaches to tutoring (e.g., Ellson Model, Frager Model, Harrison Model). To identify tutoring techniques that seemed most effective, the experimenter observed each tutor while he worked with at least two learners. Some of the techniques identified resulted directly from the tutoring models that were evaluated; others are completely unique to the objectives.

After a basic set of tutoring techniques were identified, tutoring procedures were formulated that incorporated these techniques. Using the newly formulated tutoring procedures the experimenter trained two student tutors and observed them working with several children. Training for the next group of tutors was modified as a result of the evaluation of the previous group of tutors; this group of tutors was observed while tutoring and further revisions in the procedures were made based on these observations. Additional evaluations and revisions of the tutorial procedures were carried out until it appeared fairly evident that the learners were consistently profiting from the individualized tutoring.

[1] Santa Monica Unified School District

In the final form the tutorial procedures consist of ten specified tutoring techniques. Three of the techniques are employed by the tutor before he requires the younger child to deal with the problems. The remaining seven techniques are employed by the tutor while the child is dealing with the problems.

Specified Tutoring Techniques

1. Do things to put the child at ease.

2. Clarify the prescribed task.

3. Teach the child how to verify his answer.

4. Have the child read each equation aloud.

5. Have the child mark his answer before providing any feedback.

6. Have the child verify his answer.

7. Avoid punishing behavior.

8. Provide the child with verbal praise when appropriate.

9. Reward the child when appropriate.

10. Check for mastery of designated problems.

PHASE II - VALIDATION OF SPECIFIED TUTORING TECHNIQUES

By means of a diagnostic test, sixteen first-graders were identified who were unable to solve a particular type of sentence equation. (e.g. 3 - 1 =☐) These children were randomly assigned to two groups. One group to be tutored by upper-grade elementary children who were trained by the experimenter, and the other group to be tutored by upper-grade elementary children who received no training.

The untrained tutors were introduced to the instructional materials and told they had been selected to tutor first-grade children who needed help with their math. They were told their job was to teach the child how to do the problems.

It was found that the Greater Cleveland Mathematics materials were not entirely adequate, consequently special instructional materials were prepared. These materials consisted of practice items (sentence equations) sequenced according to difficulty. Both groups of tutors used these instructional materials.

The time required for the trained tutors to bring the younger children to specified criteria was recorded. The time required ranged from one to four tutoring sessions of approximately twenty minutes duration. As far as it was possible, the time the untrained tutors spent tutoring the younger children was kept constant with the time that had been recorded for the trained tutors.

The experimenter observed all tutors while they were working with the younger children. It was noted that the trained tutors were very consistent in following the specified tutorial procedures. In contrast, the untrained tutors consistently did things that would appear to interfere with learning (e.g. punishing behavior, extensive over-cueing, no verbal praise, no friendly conversation, non-instructional conversation, feedback before written response, no effort to clarify prescribed task.)

A parallel form of the diagnostic pre-test used in selecting the first-graders was used to measure learning gains following the individualized tutoring. All eight children who were tutored by trained tutors were successful in solving every problem on the post-test. In contrast, only two of the eight children who were tutored by untrained tutors were able to solve <u>any</u> of the problems on the post-test.

Even though these results were quite dramatic, it was decided to compare the effectiveness of trained and untrained student tutors in helping first-graders who were having difficulty with another form of the sentence equation. A diagnostic test was used to identify first-graders who were having difficulty with additive sentence equations with the unknown in the middle position (e.g. $3 + \square = 5$). Once again these children were randomly assigned to two treatment groups. One group to be tutored by upper-grade elementary students who were trained by the experimenter, and the other group to be tutored by upper-grade

elementary students who received no training. Each tutor was allowed to work with the younger child one-half hour per day for four days using instructional materials prepared by the experimenter. The following are the mean scores on both the pre- and post- test of the two treatment groups.

TREATMENT GROUP	n	Six-Item Pre-test		Six-Item Post-test	
		Mean	S. D.	Mean	S. D.
Tutored by untrained tutors	6	1.5	1.51	1.5	1.97
Tutored by trained tutors	9	0.5	0.72	4.4	2.35

Based on these results it was concluded that the specified tutoring techniques did enhance a student tutor's ability to help a younger child learn to solve sentence equations successfully.

PHASE III - DEVELOPMENT AND VALIDATION OF TUTOR-OBSERVATION SCALES

Various forms of tutor-observation scales were tried out throughout the first phase of the study when the specified tutoring techniques were being identified. Over a six months period the observation underwent several evaluations and revisions until it proved effective as a valid and accurate measure of whether or not a student tutor used the specified tutoring techniques, and if so, what percent of the time when it is appropriate.

Once the tutoring techniques were identified, it was found they fell into two different categories. Three techniques are procedures followed before the learner is required to deal with the problems. The remaining seven techniques are procedures the tutors follow when the child is trying to solve the problems. The three pre-instruction techniques are used each time a tutor works with a younger child for the first time. The use of the remaining seven techniques is contingent to a great extent on the response of the younger child to the problems. Consequently, two separate scales were developed. Scale I provides a measure

of the tutor's ability to use the three pre-instruction tutoring techniques. Scale II provides a measure of the tutor's ability to use the remaining seven instructional tutoring techniques.

The scales were validated by having raters observe tutors who had been trained by the experimenter, and then comparing the scores recorded by two raters working independently. It was found that with relatively little practice in the use of the scales, the discrepancy in the scores recorded by two raters was extremely low. By instructing the student tutors to omit one or more of the specified tutoring techniques while they were being observed by two raters, it was substantiated that the scales were consistently capable of providing a measure of tutors' mastery of the tutoring techniques. The final form of the two scales, and the procedures followed when rating a student tutor are found in Appendix A.

PHASE IV - EMPIRICAL FORMULATION OF TUTOR-TRAINING PROCEDURES

Based on the experience of the experimenter in training student tutors in connection with a previous study (Harrison, 1967), tutor-training procedures were formulated for this study. The previous study had shown that in order for most fifth and sixth grade students to be effective in the use of specified tutoring techniques, they must have opportunities to practice these techniques under the guidance of a trainer. Consequently, the first version of the training procedures consisted primarily of practice in the use of the specified tutoring techniques. After numerous trials and revisions of the training procedures, the following specified training procedures were arrived at:

1. Provide the student tutors independent study materials (Appendix B) that introduce the first four tutoring techniques.
2. By means of charts (Appendix C) review the first four tutoring techniques when the tutors meet with the trainer for the first time.
3. Let the student tutors practice using the first four tutoring techniques by role-playing.*

* The tutors are divided up into pairs and take turns playing the role of the tutor. When they play the role of the younger child they are provided cue-cards (Appendix D) which instruct them to make errors, etc.

4. Provide the student tutors independent study materials (Appendix B) that introduce the fifth and sixth tutoring techniques.
5. By means of charts (Appendix C) review the fifth and sixth tutoring techniques when the tutors meet with the trainer the second time.
6. Let the student tutors practice using the fifth and sixth tutoring techniques by role-playing.
7. Provide the student tutors independent study materials (Appendix B) that introduce the last four tutoring techniques.
8. By means of charts (Appendix C) review the last four tutoring techniques.
9. Let the student tutors practice using the last four tutoring techniques by role-playing.
10. Let the student tutors tutor a first-grader under the supervision of the trainer.

PHASE V - VALIDATION OF TUTOR-TRAINING PROCEDURES

TRAINING OF TUTORS

Selection of Tutors

Each fifth-grade and sixth-grade teacher received a memorandum from the principal, explaining that some fifth and sixth graders were going to be selected to be trained to tutor first-grade children. The memorandum briefly explained the nature of the training and the time that would be required. Each teacher was requested to provide the names of approximately ten students in his class whom he would like to see considered for participation in the project. From these lists sixteen tutors were randomly selected.

Tutor Training

The prescribed training procedures were used to train the sixteen student tutors who had been randomly selected. The training was carried out in four training sessions of approximately 30 to 40 minutes duration over a four day period.

RATERS

Function

The same two raters were used to evaluate the student tutors after the training was completed. The raters used the tutor-observation scales to evaluate each tutor's mastery of the ten specified tutoring techniques.

Qualifications

One of the raters was a member of the staff in the Education Systems Department of System Development Corporation (SDC), Santa Monica, California. The other rater had previously worked in the Education Systems Department of SDC for one year. In the opinion of the experimenter, both raters made every effort to be completely objective in evaluating the student tutors.

Training

The raters were trained by the experimenter in the use of the observation scales. In the first phase of the training the raters were acquainted with the tutor criterion behaviors and the procedures that were to be followed when using the scales. Once the raters were thoroughly acquainted with the specified behaviors for each of the tutoring techniques and with the procedures for using the scales, they were given an opportunity to rate student tutors in schools other than those participating in the study. The raters were instructed to go over the scales together after the practice rating sessions, and where they were not in agreement to attempt, as far as possible, to come to an agreement as to how various behaviors would be handled. By the end of the training, the raters had reached a point of agreement regarding the various ramifications in the use of the observation scales that resulted in high correlation in the scores recorded by the raters.

Interjudge Reliability

Table I is a summary of the number of times the scores recorded by the raters for the 16 student tutors were identical, and the number of times there was a gross discrepancy in the

scores recorded by the raters. * The raters were basically in agreement 90% of the time in their evaluation of the performance of the 16 student tutors. The high correlation between the scores recorded by the raters is accounted for by the precise specification of tutor criterion behaviors and the training the raters received in the use of the observation scales.

EVALUATION OF STUDENT TUTORS

When the training of the student tutors was completed, the raters evaluated the student tutors while they were working with the first-graders. Each tutor covered the same set of practice problems with the child during the evaluation session. The tutors were told prior to the evaluation session that there would be observers in the room taking notes while they worked with the younger children.

The children used in the phase of the study were children who had generally scored between 10% and 30% on a diagnostic test. The instructional materials covered by the children were designed to allow them to answer approximately half the problems correctly without any difficulty, and to answer approximately half of the problems incorrectly on the first response. The purpose of the special instructional materials was to insure, as far as possible, that each tutor would be required to deal with approximately the same number of correct and incorrect responses.

The raters used the tutor-observation scales to evaluate each tutor's performance. The scales were designed to evaluate a tutor's ability to follow the specified procedures when tutoring a younger child. Scale I provided a measure of the tutor's ability to use three of the ten specified tutoring techniques. These three techniques involved following certain procedures before the learner was required to deal with the problems.

* The discrepancy between the scores recorded by the raters was considered gross if it was greater than 50%.

TABLE I

INTERJUDGE RELIABILITY

RATER AGREEMENT	TUTORING TECHNIQUES									
	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
Agreement	14:16	12:16	16:16	15:16	16:16	15:16	14:16	16:16	14:16	14:16
Gross Discrepancy	1:16	0:16	0:16	0:16	0:16	1:16	0:16	0:16	1:16	0:16

1. Do things to put the child at ease.

   Specified behavior:
   a. Engage in non-instructional conversation (at least two questions or comments.)
   b. Praise the child for something.

2. Clarify the prescribed task.

   Specified behavior:
   a. Determine if child knows the meaning of signs and symbols used in the equations. (This should be done before the tutor requires the child to deal with the first problem.)
   b. By means of some type of example, explain how the problems are solved. (This should be done before the tutor requires the child to deal with the first problem.)

3. Teach the child how to verify his answer.

   Specified behavior:

   a. Before providing any feedback on the child's response to the first problem, the tutor will help the child carry out the function of the sign (+ or -) using object (e.g., fingers, tokens, pennies, circles drawn on the page, etc.)
   b. The tutor will provide the child with a basis for determining whether or not the answer is correct. (When the function of the sign is carried out, the resulting number should equal the last number in the equation.)

The raters evaluated the tutors in terms of the specified behaviors. A tutor's score for each of the three tutoring techniques was based on the number of specified behaviors (two possible for each technique) evidenced by the tutor while working with the younger child.

Scale II provided a measure of the tutor's ability to use the remaining seven tutoring techniques. These seven techniques involved following certain procedures when the child was trying to solve the problems.

1. Have the child read each equation aloud.

   Specified behavior:

   The child will read each problem aloud before marking the answer.

2. Have the child mark his answer before providing any feedback.

   Specified behavior:

   The child will mark his answer before receiving any feedback or confirmation from the tutor.

3. Have the child verify his answer.

   Specified behavior:

   The tutor will help the child check his answer and then have the child determine whether or not his answer is correct.

4. Provide the child with verbal praise when appropriate.

   Specified behavior:

   a. If the child's first response is correct, the tutor will praise the child when he determines his answer is correct.

   b. If the child discovers the correct answer, the tutor will praise the child when the child determines a given answer is correct.

   c. The praise will consist of something more positive than "O. K." or "Right."

5. Avoid punishing behavior.

Specified behavior:

a. If the child's verbal or written response to a problem is incorrect, the tutor will not say "No," "That isn't right," "That's wrong," etc.

b. The tutor will have the child determine the answer is incorrect and then assist him in discovering the correct answer.

6. Reward the child when appropriate.

Specified behavior:

a. If the child's first response is correct, the tutor will reward the child when he determines his answer is correct.

b. If the child discovers the correct answer without any assistance from the tutor, the tutor will reward the child when he determines what the correct answer is (on problems marked with "X").

c. The reward will consist of some type of symbol (e.g., star (*), "O.K." "+," etc.)

7. Check for mastery on designated problems.

Specified behavior:

a. If the problem is marked "X" the tutor will require the child to attempt to check his answer completely independently.

b. If the child is unable to determine what the correct answer is after three tries, or if the child seems unable to check the answer by himself, the tutor will say: "O.K. let's go on to the next problem."

Scores for each of the seven tutoring techniques on Scale II were arrived at by computing the ratio between the number of opportunities a tutor had to use a specified tutoring technique and the number of times he used the technique (e.g., the tutor has eight opportunities to reward the child and succeeds in rewarding him six times).

The scores recorded by each rater were arrived at completely independently; in no instance did the raters discuss the performance of the tutors. The final score for each student tutor on the ten tutoring techniques was arrived at by averaging the scores recorded by the two raters.

III. RESULTS

Table II presents a summary of the individual scores on the ten specified tutoring techniques.

TABLE II

SUMMARY OF INDIVIDUAL TUTOR SCORES

Tutor	Tutoring Techniques									
	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
Stanley	100%	75%	100%	100%	100%	100%	100%	100%	100%	20%
Cheryl	50%	50%	100%	100%	100%	100%	100%	00%	91%	100%
Valerie	100%	75%	100%	100%	100%	100%	100%	100%	100%	80%
Tammy	50%	50%	100%	100%	100%	100%	100%	100%	100%	100%
Dean	100%	100%	100%	93%	100%	100%	100%	00%	100%	00%
Sylinia	25%	75%	100%	100%	100%	100%	100%	100%	100%	100%
Sharon	50%	50%	100%	100%	100%	100%	100%	100%	100%	100%
Jean	100%	75%	100%	100%	100%	100%	100%	100%	100%	50%
Mike	100%	100%	100%	100%	100%	100%	100%	00%	71%	100%
Billy	100%	100%	100%	100%	100%	100%	90%	35%	100%	75%
Susan	100%	100%	100%	100%	100%	100%	50%	100%	100%	100%
Harriet	100%	100%	100%	100%	100%	100%	100%	33%	100%	100%
Sandra	100%	100%	100%	100%	100%	100%	66%	100%	100%	100%
Barbara	75%	100%	00%	100%	100%	32%	50%	33%	100%	00%
Linda	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Janine	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Mean	84.3	84.3	93.7	99.5	1000	98.0	97.5	68.5	97.2	72.8

Based on these results, it can be concluded that the training procedures were effective in training the student tutors to use specified tutoring techniques. Generally the tutors were consistent in their use of the tutoring techniques. The results suggest that the training strategy was basically sound, and would appear to have utility for similar training.

IV. DISCUSSION

A review of the literature established the following facts about intergrade tutoring: (1) the number of schools attempting some form of intergrade tutoring has increased significantly in the last few years; (2) in most instances the student tutors receive no training beyond a brief orientation; (3) in spite of the lack of hard data "most educators feel tutoring works" (Thelen, 1968). The assumption that a tutor will automatically use certain established psychological principles of learning seems to be the basis of the over all justification for intergrade tutoring. The findings of previous studies challenge this prevailing assumption. Previous studies have shown that untrained tutors generally do not utilize established psychological principles of learning and consequently are limited in their ability to help learners master specified objectives. In the light of mounting evidence, it must be concluded that the instructional model (e.g., induce sustained activity, reinforce the child for every correct response, etc.) that is frequently associated with individualized tutoring is not consistently realized unless the tutor is trained to perform prescribed functions when tutoring a younger child.

Based on the conclusions of Travers (1962), it is doubtful that simply establishing the feasibility of identifying valid training procedures will alleviate the problem. Following his study dealing with the relationship of psychological research to educational practice, Travers concluded that the results of research and innovation are not likely to be translated into improved practice unless embodied in a tangible product which had been shown to be effective. Travers further concluded "If the sole product of research is principles, conclusions, or scientific laws, it is much less likely that research on instruction will be applied." The next critical step in research dealing with the training of student tutors is to investigate the feasibility of developing validated exportable tutor-training materials that can be utilized completely independent of a researcher. Unless exportable validated tutor-training materials are made available to schools, student tutors will probably continue to go untrained. The critical question is whether validated tutor-training materials will ever be made available to schools on a large scale. Several

factors suggest that they will not: (1) It is extremely unlikely that elementary or secondary schools will find the money, expertise, or time to develop validated tutor-training materials. (2) Thus far, publishing companies have not been willing to expend the money required to validate training materials that require trial and revision. (3) For the most part, other agencies (e.g., R.&D. centers, Regional Laboratories) are finding that a genuine commitment to the trial-and-revision strategy required to develop effective instruction materials is difficult to live with. Consequently, unless there is a real market for tutor-training materials, validated tutor-training materials will probably never be developed on a large scale. Hopefully, educators using student tutors will realize how important it is that the tutors be trained and will begin to request training materials. If this happens on a fairly large scale, a market will be created that will stimulate efforts to develop tutor-training materials.

Two questions would then arise: will the training materials be based on validated tutoring techniques and will they be replicable? If either of these criteria is not met the materials will be of dubious value. Each criterion poses unique problems. There is a danger that tutor-training materials will be developed and marketed that do not meet these specifications. If educators fail to make a distinction between tutor-training materials which are validated in terms of significantly enhancing a student tutor's ability to help a learner master specified objectives and tutor-training materials per se, this will prove to be the case.

If the extensive use of students as tutors continues, one recommended solution to the problem would be for "buyers" (school districts, the Federal Government, etc.) to contract with publishers to develop tutor-training materials that meet certain specifications. The prime specification should be that the training materials successfully teach student tutors to use effective tutoring techniques; effectiveness being measured in terms of the benefit to the learners.

This approach to the development of tutor-training materials is very probable if a concerted effort is made in the future to provide more effective instruction for disadvantaged children in the primary grades. This experimenter is convinced that additional research will establish that in many instances disadvantaged children profit less from group instruction than do advantaged

children. This will then result in a greater focus on various approaches to individual instruction.

In terms of cost alone, intergrade tutoring would seem to be the most feasible approach to providing individual instruction to disadvantaged children in the primary grades. If the primary grades start to receive more focus, monies will most likely be made available to support the development of validated tutor-training materials.

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APPENDIX A

TUTOR-OBSERVATION SCALES AND TUTOR CRITERION BEHAVIOR

TUTOR-OBSERVATION SCALE*

SCALE I

TUTOR _____ PUPIL _____

OBSERVER _____ DATE _____

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1. ESTABLISH RAPPORT WITH CHILD (X)

   a. Engage in non-instructional conversation (at least two questions or comments.) _____

   b. Praise the child for something. _____

---

2. EXPLAIN OBJECTIVE

   a. Determine if child knows the meaning of signs and symbols used in the equation. _____

   b. By means of some type of example, explain how the problems are solved. _____

---

3. TEACH THE CHILD HOW TO VERIFY HIS ANSWER

   a. Help the child carry out the function of the signs (+ or -) using objects (e.g., fingers, tokens, pennies, circles drawn on page, etc.) _____

   b. Provide the child with a basis for determining whether or not the answer is correct. _____

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*This scale was used by the raters

TUTOR-OBSERVATION SCALE

SCALE II

TUTOR _____ PUPIL _____

OBSERVER _____ DATE _____

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
4. Child reads problem aloud																
5. Child makes written response before receiving feedback																
6. Tutor helps child check answer before providing feedback																
7. Tutor provides verbal praise when child arrives at correct answer																
8. Tutor rewards the child if first response is correct																
9. Tutor avoids punishing behavior following incorrect response																
10. On designated items child checks answer independently																

*This scale was used by the raters

INSTRUCTIONS FOR USE OF SCALES

SCALE I

Establish Rapport With Child

If tutor evidences appropriate behavior, check where indicated, otherwise leave blank.

Explain Objective

This behavior should be exhibited by the tutor using the sample problem at the top of the page. If tutor evidences appropriate behavior, check where indicated, otherwise leave blank.

Teach the Child How to Verify his Answer

This behavior should be exhibited by the tutor helping the child solve the first problem. Check where indicated if behavior is shown, otherwise leave blank.

SCALE II

If the child exhibits the appropriate behavior, mark "+" in the box under the appropriate column; if not mark "-" in the box.

When there is no opportunity for a behavior to arise (e.g., the child's first answer is not correct, or the item is not marked for independent checking) mark "O" in the box.

TUTOR CRITERION BEHAVIOR

1. ESTABLISH RAPPORT WITH CHILD

   a. Engage in noninstructional conversation (at least two questions or comments.)

      Examples: 1. Ask child name; 2. Ask child age; 3. Ask child about pets; 4. Comment about child's clothes, etc.

   b. Praise the child for something.

      Examples: 1. Article of clothing; 2. Child's ability to do something, etc.

2. EXPLAIN OBJECTIVE

   a. Determine if child knows the meaning of signs and symbols used in the equations. (This should be done before the tutor requires the child to deal with the first problem.)

   b. By means of some type of example, explain how the problems are solved. (This should be done before the tutor requires the child to deal with the first problem.)

3. TEACH THE CHILD HOW TO VERIFY HIS ANSWER

   a. Before providing any feedback on the child's response to the first problem, the tutor will help the child carry out the function of the sign (+ or -) using objects (e.g., fingers, tokens, pennies, circles drawn on the page, etc.)

b. The tutor will provide the child with a basis for determining whether or not the answer is correct. (When the function of the sign is carried out, the resulting number should equal the last number in the equation.)

4. CHILD READS PROBLEM ALOUD

The child will read each problem aloud before marking the answer.

5. CHILD MAKES WRITTEN RESPONSE BEFORE RECEIVING FEEDBACK

The child will mark his answer before receiving any feedback or confirmation from the tutor.

6. CHILD CHECKS ANSWER BEFORE RECEIVING FEEDBACK

The tutor will help the child check his answer and then have the child determine whether or not his answer is correct.

7. TUTOR PROVIDES VERBAL PRAISE WHEN CHILD ARRIVES AT CORRECT ANSWER

a. If the child's first response is correct, the tutor will praise the child when he determines his answer is correct.

b. If the child discovers the correct answer, the tutor will praise the child when the child determines a given answer is correct.

c. The praise will consist of something more positive than "O. K." or "Right."

8. TUTOR REWARDS THE CHILD IF FIRST RESPONSE IS CORRECT, OR CHILD DISCOVERS THE CORRECT ANSWER WITHOUT ANY HELP

a. If the child's first response is correct, the tutor will reward the child when he determines his answer is correct.

b. If the child discovers the correct answer without any assistance from the tutor, the tutor will reward the child when he determines what the correct answer is (on problems marked with X).

c. The reward will consist of some type of symbol (e.g., star, "O.K.," "+", etc.).

9. TUTOR AVOIDS PUNISHING BEHAVIOR FOLLOWING INCORRECT RESPONSE

a. If the child's verbal or written response to a problem is incorrect, the tutor will not say: "No," "That isn't right," "That's wrong," etc.

b. The tutor will have the child determine the answer is incorrect and then assist him in discovering the correct answer.

10. ON DESIGNATED ITEMS CHILD CHECKS ANSWER INDEPENDENTLY

a. If the problem is marked (X), the tutor will require the child to attempt to check his answer completely independently.

b. If the child is unable to determine what the correct answer is after three tries, or if the child seems unable to check the answer by himself, the tutor will say: "O.K., Let's go on to the next problem."

TUTORING SKILLS

A. DO THINGS THAT WILL PUT THE CHILD AT EASE

As a tutor it is very important that you ASK THE CHILD FRIENDLY QUESTIONS AND DO THINGS THAT WILL MAKE HIM FEEL GOOD SO HE WILL NOT BE FRIGHTENED.

Steps to follow

When you ask the child questions, speak in a friendly voice and speak clearly. Be careful not to speak too fast.

1. The first thing you do is smile and say: "Hello. My name is _____. What is your name?"

2. Then you ask: "Do you have a pet?"

   If so, "What is its name?"
   If not, "What kind of pet would you like to have?"

   Note: Each time the child answers a question, you say something before you ask another question, For example, after this question you could say "I have a dog."

3. Then you ask: "Do you like to play games?" After the child answers, say: "We are going to play some fun games with numbers."

4. Then you ask: "Can you count to five?" After the child counts, say: "Very good. You really know your numbers." (Praising the child for counting is very important.)

Learn these questions before you attend the first training session because you will practice asking these questions without looking at your study materials in the first training session.

B. CHECK TO SEE IF THE CHILD KNOWS THE MEANING OF THE SIGNS USED IN THE EQUATIONS

The first set of problems has a sample problem at the top of the page. You use this problem to see if the child knows the meaning of the signs used in the equations.

Steps to follow

1. Point at the plus (+) and (-) signs in the sample problem and ask: "Do you know what this sign means?"

   a. If the child answers correctly, say: "That is right. Very good."

   b. If the child does not know or answers incorrectly, tell the child what the sign means and have the child repeat it.

2. Point at the $\square$ sign and ask: "Do you know what we call this box?"

   a. If the child answers correctly, say: "That's right. Very good."

   b. If the child does not know or answers incorrectly, say: "We call this some number." Have the child say "Some number."

3. Point at the equal (=) sign and ask: "Do you know what this sign means?"

   a. If the child answers correctly, say: "That is right. Very good."

   b. If the child answers incorrectly or does not know, say: "This sign means equals." Have the child say "Equals."

In the first training session you will practice going through these steps.

C. HAVE THE CHILD READ EACH PROBLEM ALOUD

Reading the problems aloud helps the child learn how to work the problems. As a tutor you must make certain that the child reads EVERY problem aloud.

Steps to follow

1. Point to the problem and say: "Would you please read the problem."

   Note: Use these definitions:
   (+) = plus (-) = minus ☐ = some number
   Example: 2 - 1 = ☐ "Two minus some number equals one."

2. If the child cannot read a sign or number, tell the child what the sign or number is and have the child repeat it.

   Example: 2 - 1 = ☐ Child: "Two plus one..."

   Tutor: Point at the minus sign and say: "This sign means minus. Say minus."

3. If the child reads a sign or number incorrectly, DO NOT say "No." Tell the child the correct sign or number and have the child repeat it.

In the first training session you will practice having the child read each problem, so it is very important that you learn these steps before the first training session.

D. EXPLAIN HOW TO DO THE SAMPLE PROBLEM

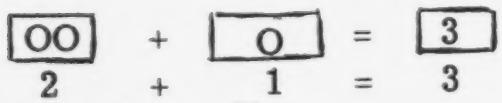
The children you will be tutoring do not know how to do the problems so you help the child do the sample problem and explain how you solved the problem.

Steps to follow

1. Have the child read the sample problem.

2. Tell the child to mark one in the middle box.

3. Draw little circles in the boxes above the first two numbers and a three in the last box.



4. Explain that by putting one in the middle box the first two numbers add up to three.

5. Have the child count the circles in the two boxes.

Read these steps over three times so you will be able to go through them in the first training session.

In summary, the following are the first four tutoring skills:

A. DO THINGS TO PUT THE CHILD AT EASE

B. ASK THE CHILD WHAT THE SIGNS MEAN

C. HAVE THE CHILD READ EACH PROBLEM

D. HELP THE CHILD WITH SAMPLE PROBLEM